LBFoster®

WILD IV

Wheel Impact Load Detector

WILDIV

Keeping You Moving

For decades, the railroading industry has relied on the Salient Systems WILD as the benchmark for detection of wheel impacts, overload, and imbalance. L.B. Foster is pleased to announce the latest development in the WILD solutions suite – the **WILDIV**.

What is a WILDIV?

The WILDIV is a hardened electronic data collection device that measures **wheel forces imparted on the rail**. The system takes measurements via rail-mounted strain gauges and processors. High impact forces can be a sign of defective wheels, which damage vehicles, cargo, and infrastructure.

WILD systems are capable of reporting **train weight and speed, wheel impacts, lateral forces, and truck hunting.** Every WILD system is accompanied by our custom web-based Wheel Data Management System – **WDMS** ®. This application allows users to configure and manage alarms, designate personnel to receive real-time alerts, and review the health status of the system.

PRODUCT FEATURES

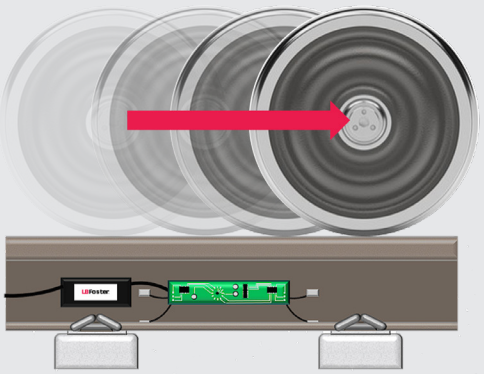
The WILD is utilized in the **freight, transit, and industrial** railroading industries to alarm when user-set thresholds for monitored parameters are reached.

Monitoring

- Wheel Impact monitoring
- Lateral force monitoring
- Weigh-in-motion
- Truck hunting monitoring
- Train speed and direction monitoring
- Rail temperature monitoring
- Automatic car counting and identification
- Self-diagnostics

Reports & Alarms

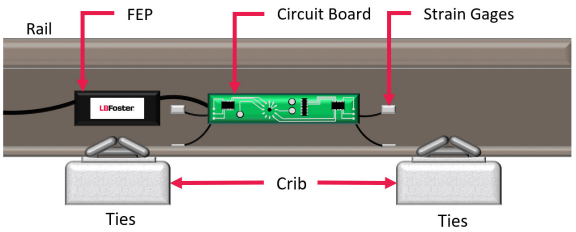
- High Impacts
- High Lateral Force
- Overloaded vehicles
- Side-to-side imbalance
- Front-to-back imbalance
- Empty cars
- Truck hunting



WILDIV
Hardware

Trackside Hardware

The WILDIV has three major components installed on-track: the strain gauges, the front-end-processors (FEPs), and V-blocks. Because a wheel's entire circumference will not roll through a single crib (the area between ties), multiple cribs must be instrumented.



Strain gauges are installed in multiple locations within each crib – two in the web of the rail, along the neutral axis, and optionally two along the base of the rail. Both the field and gauge side of the rail are instrumented with gauges, which connect to a rail-mounted circuit board that collects and feeds data to the FEPs.

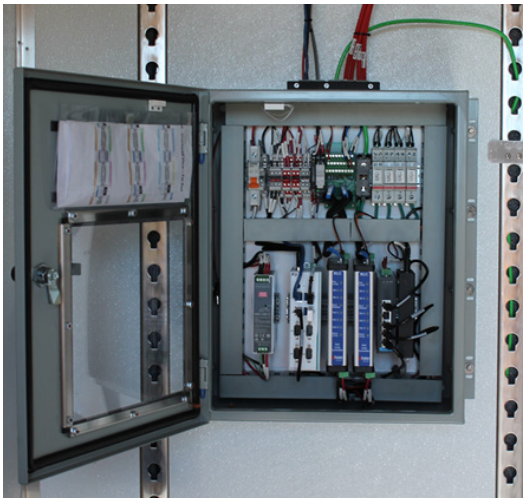
FEPs are typically installed in between cribs, over the ties. Each FEP can handle data from two cribs, meaning if 16 cribs are outfitted, there will be 8 FEPs required.

The **V-block** acts as a manifold for the power and communication cabling to and from the FEPs and circuit boards installed on-track. Cabling exits the V-block in a single conduit with quick-connect fittings allowing maintenance crews to quickly disconnect the WILD, keeping cables out of the way for ballast tamping and other maintenance.

V-blocks are installed at either end of the instrumented section of track, on the rail nearest the bungalow.

Bungalow Hardware

All data collected from a WILD is sent to a control panel located in a bungalow nearby.



The control panel is designed to mount to a 19" rack and houses the serial I/O module, logic controllers, network switches, CPU, and power supply. If an RFID tag reader system is present on-site, it will also connect to the control panel, and data may be output to a customer router located within the bungalow if available. Data collected by the control panel are sent to WDMS, where it becomes available to the customer anywhere there is an internet connection.

The control panel also acts as a direct access point for the WILD. By connecting a laptop users can access the WILD portal, which is used to configure the system and perform in-depth diagnostics.

Certain aspects of the WILD portal such as alarm and alert configuration and health status overview are also available on WDMS.

WILDIV

Configurations

The primary distinctions in WILD system design are the number, spacing, and layout of instrumented cribs. The most appropriate design depends on the type of data you are primarily interested in and the restrictions of the intended installation site. Several design configurations have been developed to maximize wheel coverage for varying train wheel diameters, shorten the instrumented area for tight installation sites, and reduce hardware costs when certain data are not desired.

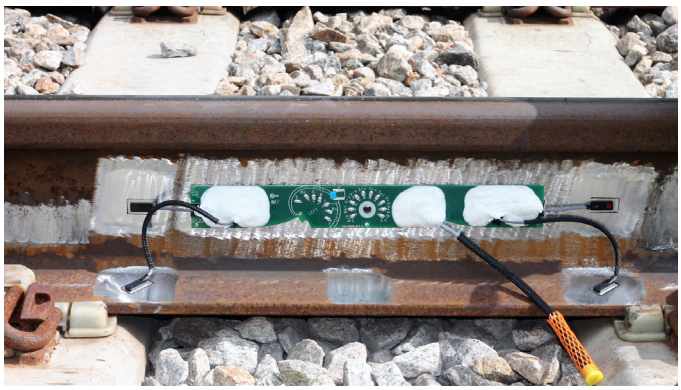
WILDFreight

The WILDFreight is the legacy design of the WILD, intended for freight rail applications. The system deploys 32 data channels (16 cribs on each rail) with strain gauges installed on both the web and base of the rail to provide the maximum accuracy and precision for all collected data.

When car weights are high and lateral forces or truck hunting are a concern, this is the most suitable design, providing the best accuracy for all reported measurements

PRODUCT FEATURES

- Wheel Impact monitoring
- Lateral force monitoring
- Weigh-in-motion
- Truck hunting monitoring
- Train data (speed, direction, car counting)
- Rail temperature monitoring



WILDTransit

The WILDTransit design has been optimized for use at transit agencies but is also appropriate for industrial and mining applications. The system deploys 16 data channels (8 cribs on each rail) and deploys strain gauges installed on the web of the rail only.

The WILDTransit is most suitable when lateral forces and truck hunting are not a concern, such as with when vehicle weights are low, or when the primary objective is identifying overloaded and imbalanced cars.

PRODUCT FEATURES

- Wheel Impact monitoring
- Weigh-in-motion
- Train data (speed, direction, car counting)
- Rail temperature monitoring

WILDIV

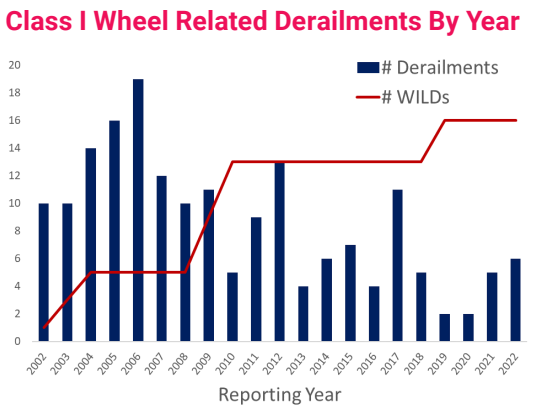
Applications

Freight

The L.B. Foster WILD has been the gold standard for targeted removal of wheel defects in the freight railroad industry. These defects cause high impacts which can damage vehicles, cargo, and infrastructure. Worse, they can lead to costly and dangerous derailments.

Data provided by the FRA Office of Safety Analysis shows that adoption of WILD products on a class I freight agency's network correlated with **a decrease in wheel and weight related derailments** from 13.5 to 5.2 annually, saving the railroad over $1.5M each year.

WILD products were the basis for and satisfy all AAR WABL Committee requirements related to wheel defect identification and removal, which



Transit

The WILD is a critical component of optimized wheel maintenance. As opposed to wheel maintenance based on time or distance intervals, defects can be identified as soon as they appear, allowing trains to be left in service longer.

Moreover, an **optimized wheel maintenance program** can lead to longer lifespans for your wheelsets. A report published in 2019 by the FRA showed that by implementing WILDs and utilizing them to inform wheel maintenance, a major U.S. Transit agency extended the lifespan of its wheelsets by over 20% in a single year, with an **estimated savings of $1.6M annually**. As targeted maintenance continues the lifespan should continue to improve, leading to even greater savings. You can read the full report here.

Another benefit of targeted wheel defect removal is its effect on **noise & vibration**. One of the most common complaints of passenger rail riders is a loud, bumpy ride. Often, these discomforts are caused by poor wheel condition.

L.B. Foster is currently partnered with a major Transit agency to quantify the effects of optimized wheel maintenance on noise & vibration, to better inform users of when a wheel is creating an issue for riders and what sort of improvement in ride quality they can expect by conducting wheel maintenance.

Industrial

Industrial and mining rail operations may benefit from either or both sets of WILD features utilized in freight and transit rail industries.

If a shortline owns its own cars, **wheelset lifespan improvements and optimized maintenance** can provide significant savings. Moreover, the overload and imbalance alarms of the weigh-in-motion features can help **prevent expensive penalties** at transfer points when unloading to other railroads.

WILDIV

Impact Monitoring

Identify hazardous wheel defects and conditions such as shelling, spalling, fractures, broken rims, flange wear, tread wear, and truck hunting.

Wheel Defects

During service, **wheel condition can deteriorate** due to various factors including tread rollover, rolling contact fatigue (RCF), and poor rail conditions. These defects may present themselves with **increases in vertical wheel impacts**, which are identified by the WILD.

Utilizing the WILD to detect wheel defects and coordinate wheel reprofiling can prevent hazardous conditions, reduce potential damage to track infrastructure, and extend the lifespan of the wheelset.

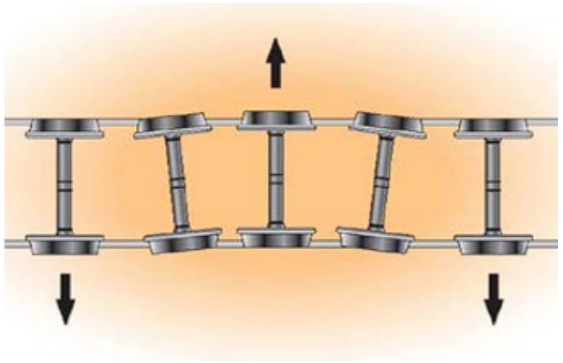
Customer testimonials speak for themselves – the WILD has proven itself countless times as an invaluable tool to end users.

> **"Photos… show the broken rim on the DTTX726103 – L4. the talker circuit at the WILD stopped the train, and quite likely prevented a derailment."**
>
> *Actual Customer Statement*

Truck Hunting

Truck hunting – the oscillation of train cars from one rail to the other as they traverse tangent track – can induce excessive lateral forces that significantly contribute to accelerated wear of rail and vehicles. This degraded vehicle performance is a leading cause of damage to delicate lading and customer complaints about ride quality.

L.B. Foster's WILD measures lateral forces on the track caused by truck hunting, accounting for the dynamic relationship between vertical and lateral loads. These measurements are processed through a highly sophisticated proprietary algorithm to produce a **Hunting Index** which can be used to identify and alarm on vehicles exhibiting excessive side-to-side motion.



WILDIV

Weigh-in-Motion

Detect and alarm on overloaded or imbalanced vehicles at track speeds.

Overloaded and imbalanced train cars are a serious hazard and contribute significantly to annual derailments. Using statistical analysis of the measured vertical loads, the WILD estimates the static weight of a rail car to determine if it is overloaded or imbalanced beyond safe operating limits.

Unlike scales and other static measurement devices, the WILD's weigh-in-motion feature can be utilized at any operating speed, allowing users to gather valuable data without hampering productivity.

The weigh-in-motion feature provides an alternative to weigh bridges by delivering a ±2% weight accuracy over 95% of the time, for a fraction of the cost.

Overload

Overloaded cars can pose hazardous conditions that damages track infrastructure and contributes to the risk of derailment. They may also lead to costly penalties at transfer points.

With the weigh-in-motion feature of the WILD, users can specify multiple overload thresholds for each type of car in their fleet, in both reported weight and percentage of total car weight. When these cars reach the user-set threshold, an alarm is generated allowing for correction of the overloaded car.

Imbalance

Even when within a car's weight limit, improper loading can be dangerous and accelerate wheel wear. Like overload, users can configure multiple imbalance thresholds for each car type.

Alarm thresholds can be configured for both side-to-side and front-to-back imbalance, allowing users to detect any hazardous loading conditions and avoid penalties.

WILDIV

Site Characteristics

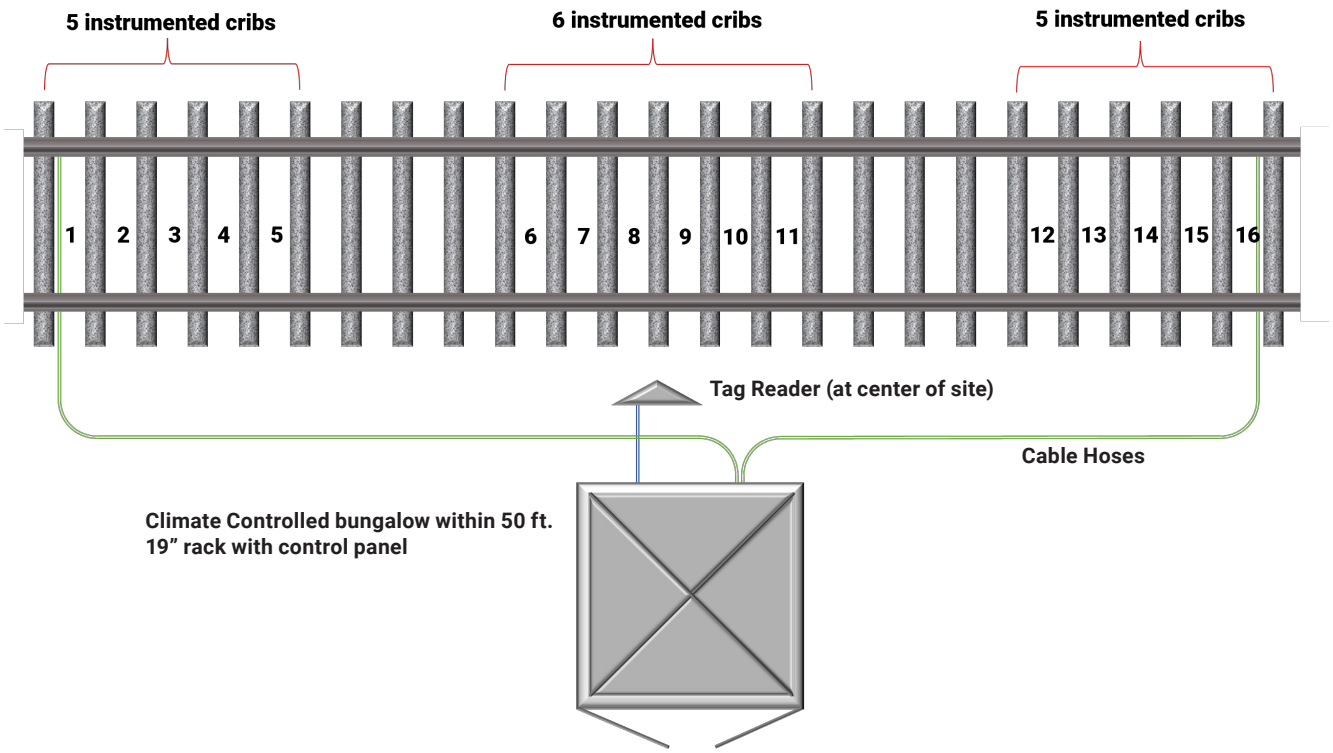
Typically, WILDs require that either 8 or 16 cribs of each rail be instrumented (for 16 or 32 total channels). These cribs may be spaced and separated in various configurations to suit your needs, maximizing wheel coverage and accuracy of data.

The ideal WILD installation site is flat, tangent track of 136RE rail for at least ¼ mile. WILD hardware must be installed on tracks supported by concrete ties. Power and communications infrastructure must be present or installed, and a climate-controlled bungalow or equipment housing must be within 50 feet of the instrumented area to house the WILD control panel.

The WILD is permanently fixed to the rail by micro-welding, so users should consider the expected remaining life of rail at the installation site. Poor or soft track underlayment may cause ties to pump or shift which could affect measurements, so users should also ensure that the track is installed on a stiff, firm substrate.

WILD systems may come with an RFID tag reader system, ideally placed at the centerline of the site. If the user's vehicle fleet is outfitted with RFID tags the tag reader system will automatically identify cars, allowing for car counting and ID information in reports and alerts.

Example Site Layout



Wheel Data Management

L.B. Foster's **Wheel Data Management System (WDMS)** is a custom web-based application that allows subscribers to review train data and configure and manage alerts from any **MK-IV WILD** data. The application is available anywhere there is an internet connection.

PRODUCT FEATURES

Reports & Alarms

Each time a train is measured by a WILD system, a report is generated listing all measured train weights, impacts, lateral forces, and hunting data.

Through the **Thresholds** page, the value for alarm parameters can be configured. Users may designate personnel to automatically receive alerts when certain alarms are generated, and multiple thresholds may be set for each parameter to classify the severity of alarms.

Data & Analytics

Users can **browse recent trains** to see every measured train consist on their network in reverse chronological order. In addition to the measured data, reports indicate the site, location, train speed, train direction, and vehicle information.

Every train report contains a table of data for each vehicle, listing all measured parameters for every axle.

Historical performance for any train, vehicle, or wheel may be filtered through the vehicle history, wheel history, and train search pages.

Site Health

Each system listed in WMDS is equipped with a **graphical interface** which provides a real-time overview of the health status of all major components. Hovering over any component will provide information on the nature of any issues as well as recommendations for troubleshooting.

Every report generated by WILDIV sites also captures a time-stamped **health status overview**, allowing users to review any issues that may have been present at the time of an alarm.

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